

October 3, prostrating telegraph lines, and doing great damage to property and shipping.

At Topolobampo all buildings were greatly damaged. The Ahomy River overflowed its banks.

The State of Sinaloa lost the entire sugar-cane crop, and so also the State of Sonora.

The town of Culiacan, the capital of Sinaloa, on the interior plateau, experienced a cloudburst, and was greatly injured. The tremendous rain on the ridge of high mountains back of the city filled the canyons and descended thence to the plateau with a fierceness never before known in that part of Mexico.

At Mazatlan many residences were damaged.

At La Paz the storm and tide combined to raise the waters in the bay to an unprecedented height, flooding the lower part of the city.

The steamer *Progreso* met the storm in the open ocean. She left San Francisco for Panama on September 24. Her course was a little farther off shore than that followed by the Pacific mail boats, and she was in rather light trim, therefore set rather high out of water. On the fifth day out, after strange barometric changes and a gale of wind, the hurricane burst upon the steamer from the southeast, but veered rapidly to the northwest. As the waves were growing higher and higher, and although there was but little daylight under the storm cloud yet a monster wave could be made out coming toward the vessel. Fortunately the *Progreso* was then headed bow on, and the wave passed clear over the bridge and the tops of the mid-ship houses, and over the whole length of the vessel, leaving a complete wreck of the deck, but without otherwise injuring the vessel.

The map of September 30 shows that on that date two well defined areas of low pressure existed; one on the Pacific coast of Mexico, and the other in the West Indian Region. As has been frequently stated in the WEATHER REVIEW, in our chapters on Atlantic meteorology, the equatorial belt of low pressure has a well-marked branch extending northward into the Gulf of California, and the general boundary of the equatorial trough is subject to very decided fluctuations both in the Atlantic and Pacific oceans. Special areas of low pressure with attending cyclonic winds become isolated from the equatorial trough, and move northward as hurricanes. These undoubtedly originate in a favorable combination of inflowing winds and the formation of areas of extended cloud and rain. The process is entirely similar to that which occurs in more northerly latitudes, when, as we have often pointed out, an elongated meiobar becomes converted into one or more well-defined whirls and storm centers. The track of the so-called La Paz hurricane can not yet be defined with sufficient accuracy to justify inserting it on Chart I, but it undoubtedly moved north or north-northeast into the Gulf of California, and broke up in that region on the 3d or 4th of October, while the West Indian hurricane (low area No. 1), moved from the neighborhood of Cuba north-northeast toward Hatteras. Pressure was lowest at Yuma on the 3d, and a trough of depression extended from that region northward into Alberta. A small number of hurricane tracks, ending on the Pacific coast of Mexico and California, were plotted by Redfield and others many years ago, and but little definite knowledge concerning them has been added since then. The Editor hopes soon to be able to publish a report from Weather Bureau officials at San Francisco giving a full account and track of the La Paz hurricane.

#### TIME RECKONING.

Some efforts that have been made to deduce very accurate results from the reports of the voluntary observers have impressed the Editor with the necessity of urging upon all observers the importance of paying close attention to the whole question of accurate time. Thus, one observer in

filling up the statement of "time used on this report," replies "ten minutes," whereas that statement is intended to call for the standard of time used by him in timing his observations and not for the quantity of time occupied by him in making out his forms. In order to compare together intelligibly observations of thunderstorms, tornadoes, hail, and other phenomena, it is necessary that the records should be kept according to some one of the several standards used by the railroad and telegraph companies of this country; that is to say, the time used in the reports should be that proper to the seventy-fifth, the ninetieth, the one hundred and fifth, or the one hundred and twentieth meridian of longitude west of Greenwich, choosing by preference the meridian that is adopted by the railroad or telegraph station in the observer's neighborhood. There are, of course, many townships so far removed from railroad and telegraph lines that these standards of time are not easily obtained, and in such places there may be some excuse for using the time proper to the local meridian. Such usage is not desirable but, if allowed, the observer should state distinctly how he obtains this local time, and should write the words "local mean time" on every report that he makes, or else he should convert his observed times into some standard hour meridian time, and use that only on his forms. Out of four hundred reports of a recent event there were at least five good observations expressed in local mean time, although the form stated that they were made in standard time; there were about twenty that were stated to be in local time but that were really in standard time of the seventy-fifth meridian; there were about thirty that were expressed in standard time of the ninetieth meridian, although the report said standard time of the seventy-fifth meridian. By far the best rule for all voluntary observers is to adhere as closely as possible to the standard of time shown by the clock at the railroad station that they are accustomed to visit, no matter whether this is the time used by others in their locality or not. Use this only on the forms and reports of observations, and state distinctly whether it is central, eastern, mountain, or Pacific standard.

A number of observers have reported the times used by them as "sun time," but this means nothing definite, as all kinds of popular times are regulated by the sun. Some use a noonday mark or a sun-dial without correcting for the equation of time and are thus actually using what is properly called the "apparent solar time proper to their local meridian." Others use the sun-dial but apply the correction for the equation of time and thus keep their clocks regulated to the "mean solar time of the local meridian." Others use the standard noonday signals that are telegraphed from Washington all over the country, and thus keep their clocks regulated to the mean time that belongs to some one of the recognized standard meridians (sixtieth, seventy-fifth, ninetieth, one hundred and fifth, one hundred and twentieth, etc.) All these are true *sun* times, and observers who have been accustomed to enter the words "sun" time on their forms should explain more definitely what is meant and how they determine their sun time.

As regards the regular observers of the Weather Bureau it is only necessary to add that their official instructions require that all reports to the Central Office be made uniformly in the standard time of the seventy-fifth meridian.

In conformity with the usage of the Bureau the times mentioned in the WEATHER REVIEW will be those of the seventy-fifth meridian, namely, the official standard at Washington, unless specifically stated to the contrary.

#### EARTHQUAKE AT SEA.

Captain Myer, of the ship *John C. Potter*, arrived at San Francisco, about October 26 and reports: "October 24, N.

43° 54', W. 128° 32', experienced a severe shock of earthquake lasting twenty-five seconds. It made the ship shake as if it had jumped over a coral reef in a heavy swell. Every man on board felt the shake, which seems to have occurred just before dinner time, and everything movable on deck started."

#### GALE AT BUENOS AYRES.

By cable dispatch on October 31, we learn that a great gale was then raging at Buenos Ayres on the coast of Argentina.

#### SAND BLIZZARD.

During the 18th, 19th, and 20th of October sand and dust storms, with low temperature and the wind at 50 miles per hour, prevailed over Minnesota, the Dakotas, and Manitoba, and the inconveniences of such a blizzard were intensified by the alkaline character of the dust. Numerous prairie fires occurred in southwestern Minnesota and South Dakota, but especially on either side of the Red River Valley.

#### DROUGHTS AND CROPS.

An article in the Monthly Review of the Iowa Service states that the average deficiency in rainfall for the whole of the State, from March to September, inclusive, was 3.51, and the total rainfall for the seven months, 21.82, and that, although this has been a droughty season, yet this rainfall was sufficient to—

Bring the most abundant crops harvested in this State for the past twenty years; and this, too, following the worst drought experienced in this State since its early settlement.

The records for the season do not furnish a basis for some of the theories that have been so confidently broached to account for the recent widespread drought. It will be observed that the Lake Region and Atlantic Coast stations suffered more than some of the western sections that have very little timber or water surface.

Evidently the notion that lakes, ponds, marshes, and forests are essential to the production of rainfall is not supported by the records of the current year.

#### THE DROUGHT AND THE WEATHER IN DISTANT REGIONS.

In connection with the drought of 1895 in the United States, the following items relative to other countries are quoted from newspaper reports:

*British Columbia.*—The Columbia River is lower than ever before known. The woods bordering on Puget Sound are very dry and suffering from forest fires. In some regions but one or two showers have fallen during July, August, September, and October.

*Alaska.*—The rain and cloudiness has been about normal during August and September in the southern part of the Territory.

*Europe.*—A drought has prevailed similar to that in the United States.

*Australia.*—A very severe drought and great distress during July, August, and September, especially in New South Wales.

*Greenland.*—The summer of 1895 was the mildest ever known in the neighborhood of Ivigtut. The mountains for the first time ever known were bare of ice and snow. Wild animals accustomed to the extreme cold have been compelled to go farther north. Blueberries were plentiful for the first time in many years. The water about the southern coasts was warm enough to bathe in and apparently not colder than on the Jersey coast. [According to reports brought by the arrival, on October 13, at Philadelphia, Pa., of the bark *Silicon* from Ivigtut.]

By the end of October the United States had realized one of the longest and most extensive droughts on record. The States of West Virginia, Kentucky, southern Ohio, and western Pennsylvania had suffered more than any other region. Rains had fallen sufficiently to secure good crops in a portion of eastern Ohio and portions of Arkansas, Indiana, Iowa and Nebraska, Missouri and Kansas, but in general, throughout the watershed of the Mississippi and its tributaries, the drought of August, September, and October has been very severe. On the Atlantic Coast the total rainfall during this growing season has also been small, but as the crops depend upon the proper distribution of the rain throughout the season, the effect of the drought has not always been so disastrous as it might have been. The general rains of the Middle States and New Eng-

land interrupted the drought in that region during the third week of October, but did not supply water to the western slopes of the Alleghanies in sufficient quantity to improve the navigation of the Ohio, which, at that time, was little better than a succession of pools. In eastern Pennsylvania the drought was considered as the most severe since 1869. On the 19th Capt. E. P. Chancellor, Supervising Inspector, reported that the Ohio River from Pittsburg to Cincinnati was lower than he had ever known it, and could be waded anywhere above Cincinnati. On the eastern side of the Alleghanies, the Potomac River, and especially the Chesapeake and Ohio Canal, were lower than ever before recorded. At Cumberland, October 11, below the dam, the bed of the river was perfectly dry from shore to shore, and there was not enough depth of water in the intake lock of the canal basin to float an empty boat. Navigation was closed until the water should rise.

At Portsmouth, Ohio, the lowest watermark at the close of October, 1895, was 2 inches below that of 1881, but not yet down to that of 1838. A special correspondent of The Evening Star, writing from Gallipolis, Ohio, November 7, states that over four or five counties in the extreme southern part of Ohio and on occasional trips into West Virginia and Kentucky he found the same condition everywhere. No rainfall since the snows of February; the effects of the drought were already felt in May, and by the first of June farmers were full of fear. Notwithstanding this, both wheat and corn gave good crops, and on the bottom lands crops were of the finest quality. Potatoes, oats, and hay gave light crops, but the apple crop was the best ever known. July, August, and September were exceedingly hot, and up to this time there had not been a single heavy rain that would wet the soil to the depth of an inch. Local showers, of very limited area and short duration, had occurred at rare intervals. People commonly said "the showers have all been going around us all summer; they had a good rain north or south of us, but we had not a drop." Very often the correspondent had a chance to test such reports, and generally found them erroneous; each locality considered itself an exceptional sufferer; but his wider observation showed that there was very little partiality in the distribution of those showers, except that they were a little more frequent and copious near the river. At Uniontown, Ky., the Ohio was so low that it is said that an old vein of coal under the river bed was worked and thousands of bushels taken out daily. Possibly, however, this was a partial error. The coal may have been dug out at Uniontown very much as it was at Milton, Ky., where the wrecks of old coal barges were uncovered and tons of coal taken out by the farmers.

A correspondent of the New York World asks—

What has become of the enormous quantity of water that has evaporated from the United States during this drought which has lasted so long that the Great Lakes have been sensibly lowered and large rivers have shrunk to mere brooks. The water is somewhere in the world, and is in reach of the telegraph and international mail service. There must have been a marked change of rainfall somewhere to correspond with our loss of water; can not the Weather Bureau find what has become of it?

This correspondent starts an interesting question, to which we must reply that it can not be definitely answered unless we have a series of daily maps of the weather, or monthly maps of average conditions for the whole globe. Notwithstanding the activity of modern weather bureaus, we have at present daily and monthly maps of only the United States, Canada, Europe, Algeria, Cape Colony, India, Japan, and Australia. The total area covered by these countries is but a small fraction of the globe, and our maps of the great oceanic areas are only compiled after years of labor in collecting the logs of vessels. If daily maps of the globe were available, we should, undoubtedly, be able to demonstrate that which at present we only have a right to suspect as the